Lawrence Basins be much more completely studied, especially in regions where the divide is narrow. Together with this we need to obtain and study the fossil forms of the Tertiary and Pleistocene. Thus and thus only can we get a much more accurate and detailed knowledge of the effect of the Glacial Period on the distribution of animals.

Plate VII. External and internal views of fossil *Unio crassidens* from Green Bay.

University of Wisconsin, Zoölogical Laboratory, November 29, 1904.

ON THE SPECIES OF MARTESIA OF THE EASTERN UNITED STATES.

BY CHARLES W. JOHNSON

Three species of the genus *Martesia* are found on the eastern coast of the United States. They are more abundant south of Cape Hatteras, becoming less common or rare to the northward. Like most burrowing shells they are subject to considerable variation. There is also a great difference in appearance between the young and adult shell, the large anterior gape of the young being closed in the adult by a calcareous deposit called the "callum" attached to either valve and extending to the middle or lower edge of the valve.

The shell has a large protoplax and a narrow elongated metaplax and hypoplax; mesoplax and siphonoplax wanting; valves with a single radial sulcus. The species can readily be distinguished by the form of the protoplax, which though showing slight variation, probably due to a favorable or unfavorable *situs*, is quite constant in its general character.

MARTESIA STRIATA (Linn.). Fig. 1.

Pholas striata Linn., Syst. Nat. 12 ed. 1111, 1767.
Pholas pusilla Linn., Syst. Nat. 12 ed. 1111, 1767.
Pholas nana Pultney, Dorset. Cat. p. 27, 1799.
Pholas falcata Wood, Gen. Conch. t. 16, f. 5–7, 1815.
Pholas clavata Lam., Anim. s. Vert. V, p. 446, 1818.
Pholas conoides Fleming, Brit. Anim. p. 457, 1825.
Pholas Hornbeckii Orb., Historia Fis. Polit. y Nat. de la isla de

Cuba, Moluscos, p. 282, pl. 25, f. 23–25 (1845); and in the French edition, p. 217, pl. 25, figs. 23–25, 1853.

Pholas semicostata H. C. Lea, Proc. Bost. Soc. Nat. Hist. I, 204, 1844; Boston, Jour. Nat. Hist. V, p. 285, pl. 24, f. 1, 1845.

Pholas terediniformis Sowb., Proc. Zoöl. Soc. 1849, p. 161.

Pholas Beauiana Recluz, Jour. Conch. IV, p. 49, pl. 2, f. 1–3, 1853.

Pholas corticaria Sowerby, Thes. Conch. II, 495, pl. 108, f. 94–96, 1855.

Martesia striata Tryon, Mon. Pholadacea, p. 92, 1862.

Martesia corticaria Tryon, Mon. Pholadacea, p. 92, 1862.

Shell narrowly wedge-shaped, thin, anterior truncated, cordate, with sinuous elevated crenulated ridges, showing slight radial sculpture anteriorly; radial sulcus slight; the posterior portion marked only by somewhat irregular concentric undulations or growth lines; callum smooth, and angulate at the line of attachment; the protoplax normally three-lobed, those of the sides sometimes wanting in the smaller specimens, giving the protoplax a "halberd-shaped" appearance as shown in the figure of *P. corticaria* Sowb. Length, 8–23 mm.

Distribution, South Carolina, Florida and the West Indies, Europe, Japan (Dunker), Philippines (Cuming). It was described by Linnaeus from southern Europe, while to the West Indian shell he gave the name of *P. pusilla*. The slight radial sulcus and angular margin of the "callum" of *P. semicostata* H. C. Lea, shows that it is undoubtedly a synonym of this species. *P. terediniformis* and *P. falcata*, as stated by Tryon, are only the young of this species. *P. Hornbeckii* Orb., also comes under this category. The type of *P. corticaria* was found in a piece of cast-up mahogany.

Through the kindness of Mr. J. J. White, of Rockledge, Florida, I received an interesting series varying in size from 8–21 mm. long. They were collected at Oceanus, Florida. These specimens were also found in drift-wood, a feature which undoubtedly accounts for the wide distribution of this species.

MARTESIA CUNEIFORMIS (Say). Fig. 2.

Pholas cuneiformis Say, Jour. Acad. Nat. Sci. II, p. 322, 1822.

Martesia cuneiformis Tryon, Mon. Pholadacea, p. 91, 1862.

Shell broadly wedge-shaped, anteriorly truncate, cordate; with broad sinuose crenulated ridges, the anterior crenulations forming

radial costae; near the deep radial sulcus the crenulations are wanting, and beyond the sulcus are merely concentric undulations or growth lines, callum smooth, line of attachment rounded, cordate; protoplax arrow-shaped with a medial depression and oblique striæ. Length, 14–18.

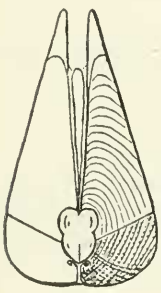

Fig. 1.

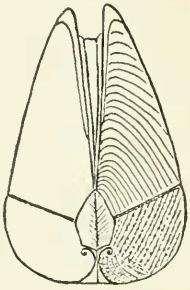

Fig. 2.

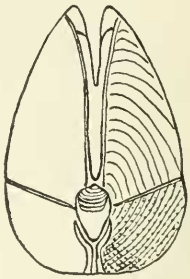

Fig. 3.

Connecticut to the West Indies. Near New Haven, Ct., in oyster shells (Perkins); Holly Beach, N. J. (Ford); Oceanus, Fla. (White), and found by the writer at St. Augustine.

Subgenus Diplothyra Tryon, 1862.

The protoplax and also the metaplax are bordered by an elevated callous margin; in the former case obliterating the deep depression in front of the umbones. Metaplax and hypoplax divaricating. Tryon considered the sculptured and smooth portions of the protoplax as a "double accessory valve," and on that character founded the genus *Diplothyra*. The above characters seem to separate it subgenerically from the typical *Martesia*.

Martesia (Diplothyra) caribæa (Orbigny). Fig. 3.

Pholas caribæa Orb., Historia, etc., p. 281, pl. 25, f. 20–21, 1845. French edition, p. 211, t. 25, f. 20–21, 1853.

Diplothyra Smithii Tryon, Proc. Acad. Nat. Sci. 1862, p. 450; Mon. Pholadacea, etc., p. 126, pl. —, f. 2, 1862.

Shell broadly wedge-shaped, inflated anteriorly and tapering abruptly towards the posterior; the anterior half with fine wavy lines forming slight radial costæ, radial sulcus quite prominent, posterior half marked only by small concentric undulations and growth lines;

the form of the protoplax is variable and the sculptured portion often very irregular or obsolete; callum round and tumid. Length, 9–17 mm.

New York to Florida, Cuba and Texas. Tottenville, Staten Island, burrowing in oyster shells (Tryon).

Although the figure given by d'Orbigny lacks the protoplax, the raised callus border surrounding it is clearly defined, while his description of the protoplax—"Ovato-oblonga, antice producta, acuta uncinata, postice dilatata angulata," agrees with what has been considered *D. smithii*. During my residence at St. Augustine (1880–87), I found a large number of fine specimens in a piece of soft artificial limestone off the water battery of Fort Marion. In my list of the shells of St. Augustine (THE NAUTILUS IV, 4) I confused this with *M. cuneiformis*. This species has only been recorded from shells and limestone while *M. striatus* and *cuneiformis* are more frequently found in wood. Its occurrence as far north as New York is probably accidental.

NOTE ON THE NOMENCLATURE OF THE SNAILS USUALLY CALLED PUPA.

BY T. D. A. COCKERELL.

Since it appears that the name *Pupa* is not applicable to the snails usually known as *Pupa muscorum*, *blandi*, etc., it becomes necessary to determine what generic name they are entitled to. Mr. B. B. Woodward has placed them in *Jaminia*, Risso, 1826, of which he regards *Pupilla*, Leach, as a synonym. A study of Dr. Dall's paper in NAUTILUS, 1904, p. 114, convinced me that this conclusion was not unassailable, and with the help of additional information very kindly supplied by Dr. Dall, I have decided to my own satisfaction in favor of *Pupilla*. The argument is as follows:

1. *Jaminia*, Risso, 1826, contained species afterwards referred to *Alæa* (1830), *Abida* (1831), *Pupilla* (1831), *Eucore* (1837), and *Sphyradium* (1837). The first species is *minutissima* Hartmann, but this does not agree with the generic diagnosis. The only figured species is an *Abida*, or *Eucore*.

2. *Alæa*, Jeffreys, 1830, contained among other things *edentula*, Draparnaud (now referred to *Sphyradium*) and *minutissima*, Hartmann. The latter is taken as the type by Dr. Dall (t. c., p. 115). Conchologically, *minutissima* has the characters of *Sphyradium*, and not at all those of *Vertigo*, *Pupilla*, etc. Its reference to *Sphyradium*